



U.S. DEPARTMENT OF  
**ENERGY**

Legacy  
Management

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# Progress of Groundwater Remediation at the UMTRCA Disposal Site Near Shiprock, New Mexico

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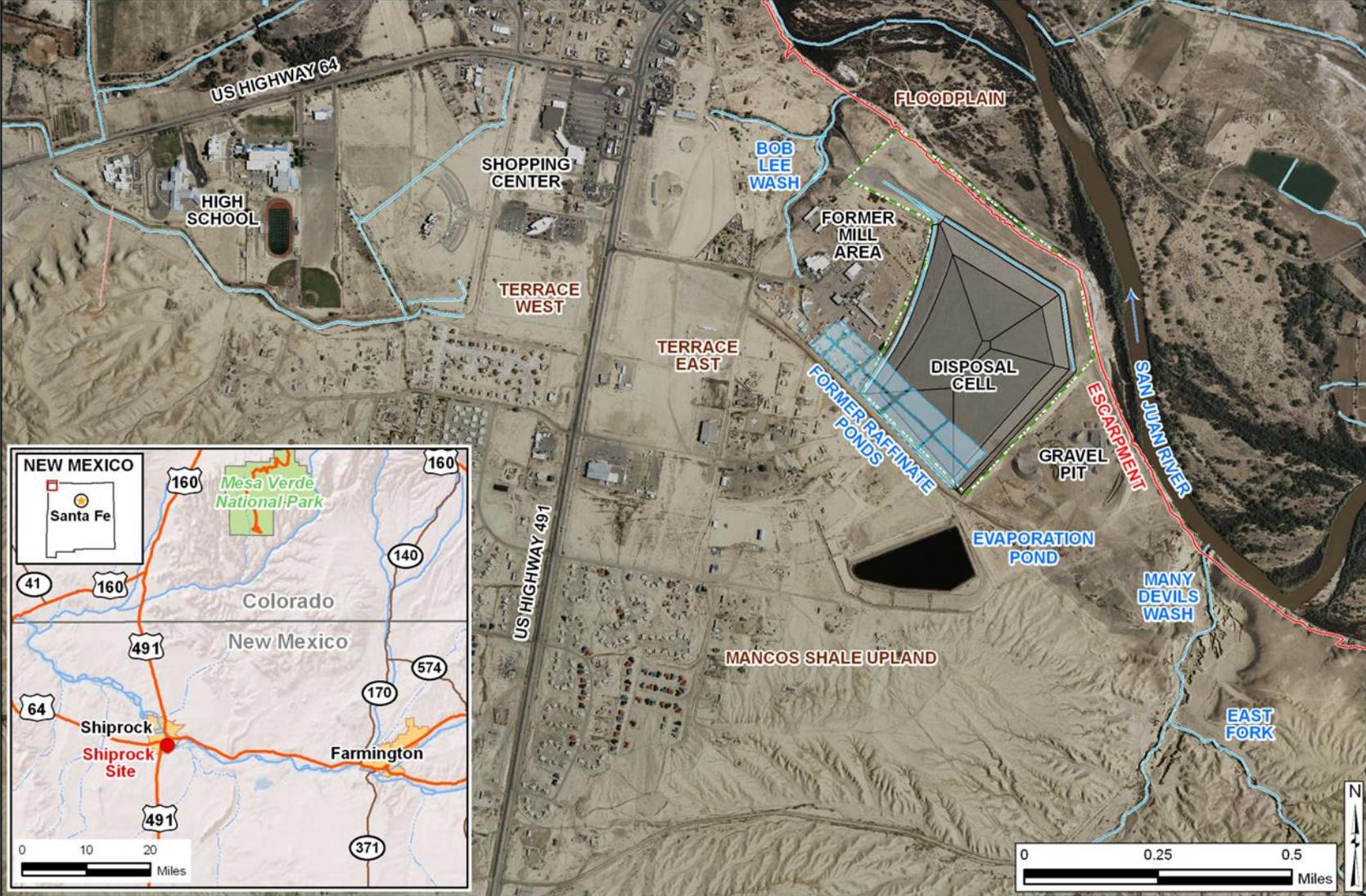
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# Regional Location and Aerial View

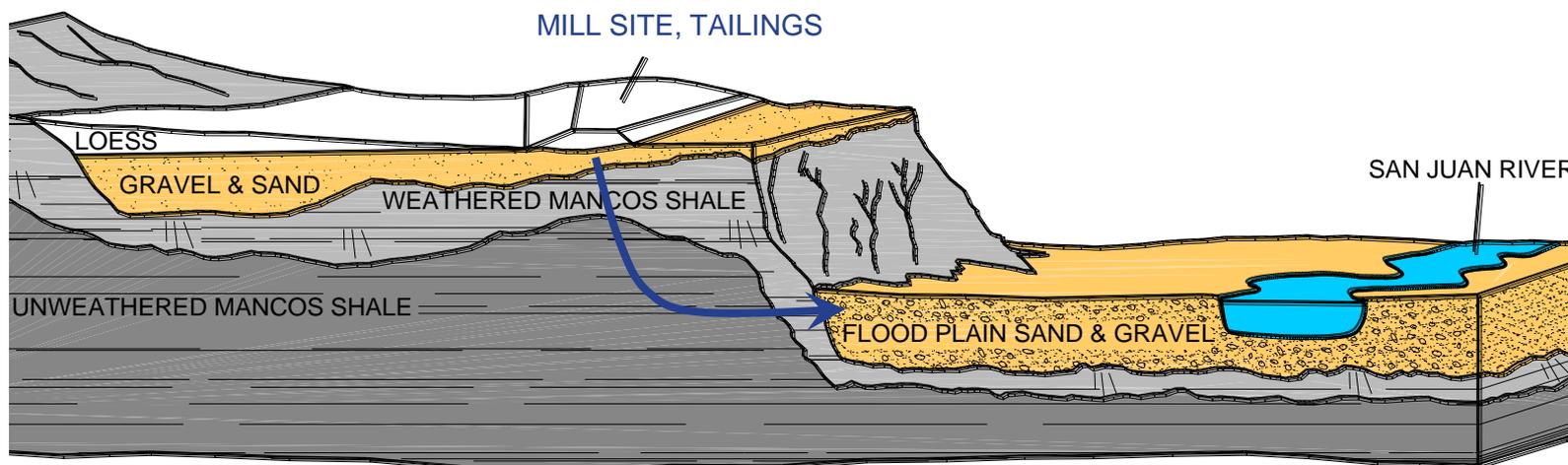


# Shiprock Site in 1965 (View East-Southeast)



# Historical Contaminant Sources

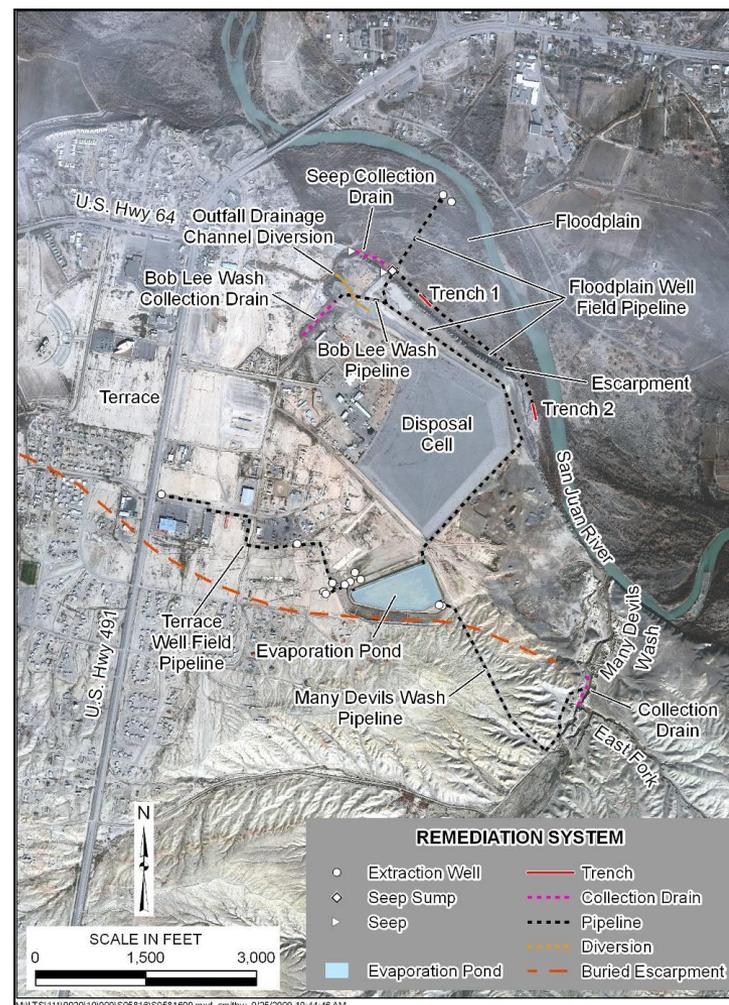
- Primary sources
  - Raffinate and tailings seepage
  - Contaminated bedrock discharge across the escarpment
  - Constituents included uranium, sulfate, and nitrate
- Additional historic sources
  - Mill-effluent pond on the floodplain
  - Windblown tailings



Schematic SW-NE geologic cross section

# Groundwater Compliance Strategy

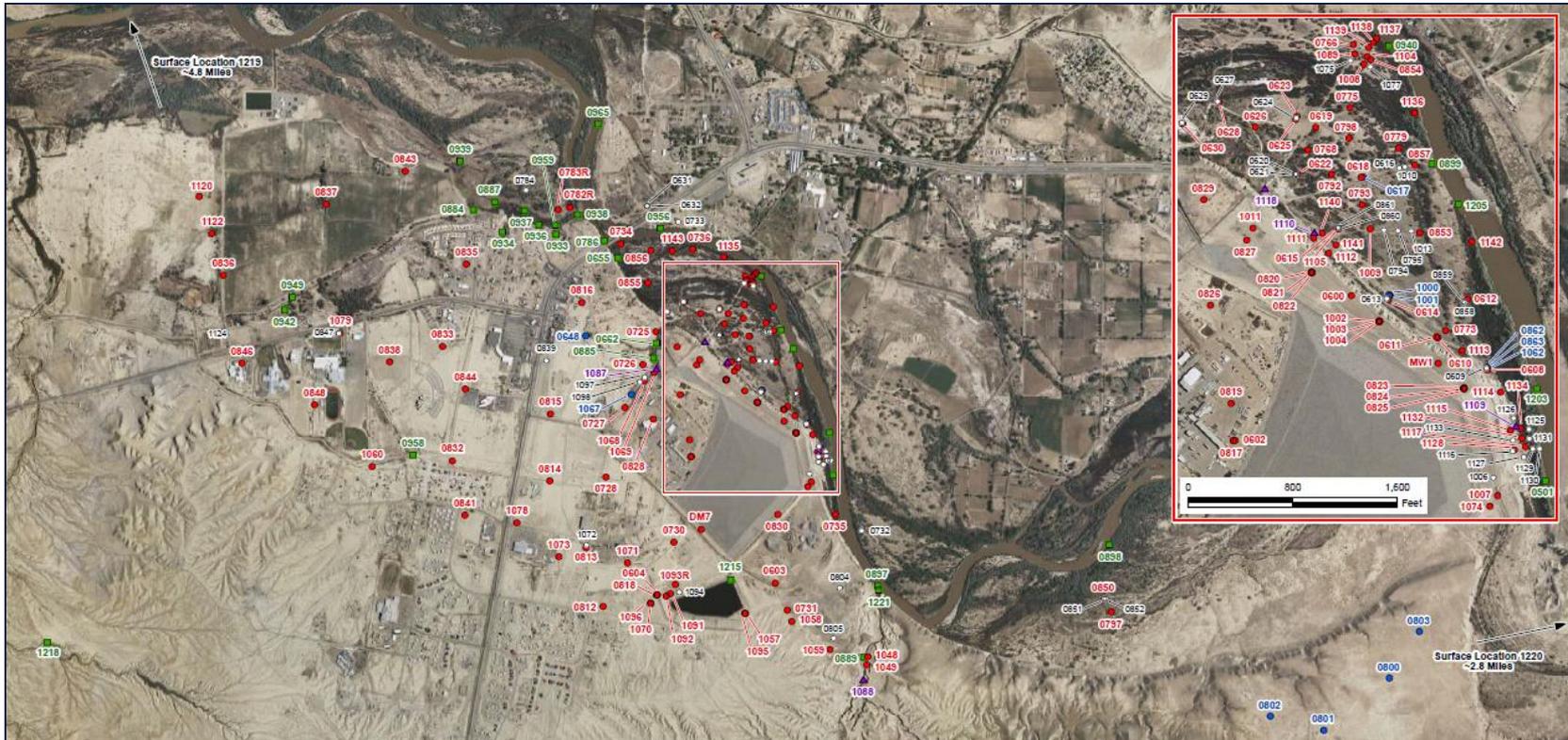
- Active remediation on the terrace
- Enhanced natural flushing in the floodplain alluvial aquifer
- Groundwater from the floodplain and terrace piped to an evaporation pond on terrace south of the disposal cell



Features of Active Remediation System,  
Shiprock, NM, Disposal Site

# Groundwater and Surface Water Monitoring

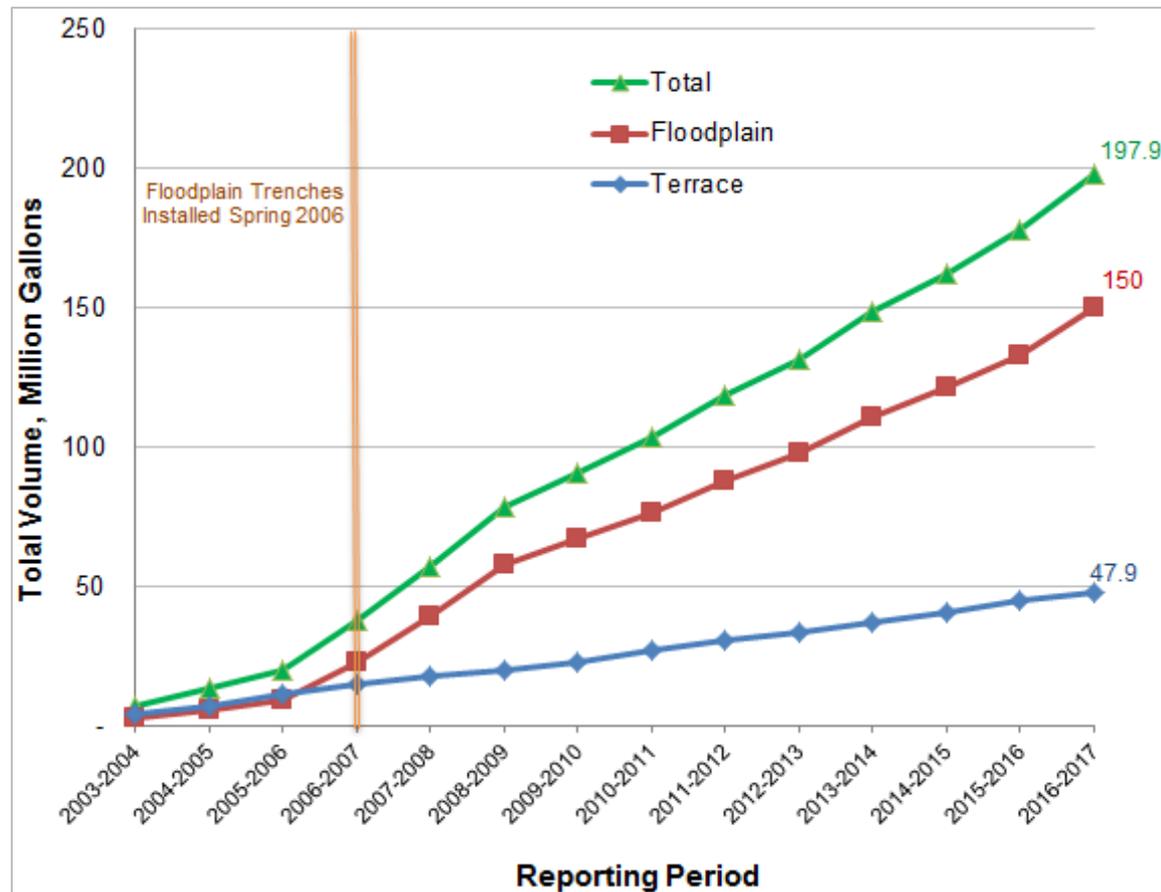
- DOE samples approximately 115 groundwater wells and 15 surface locations in fall and spring of each year



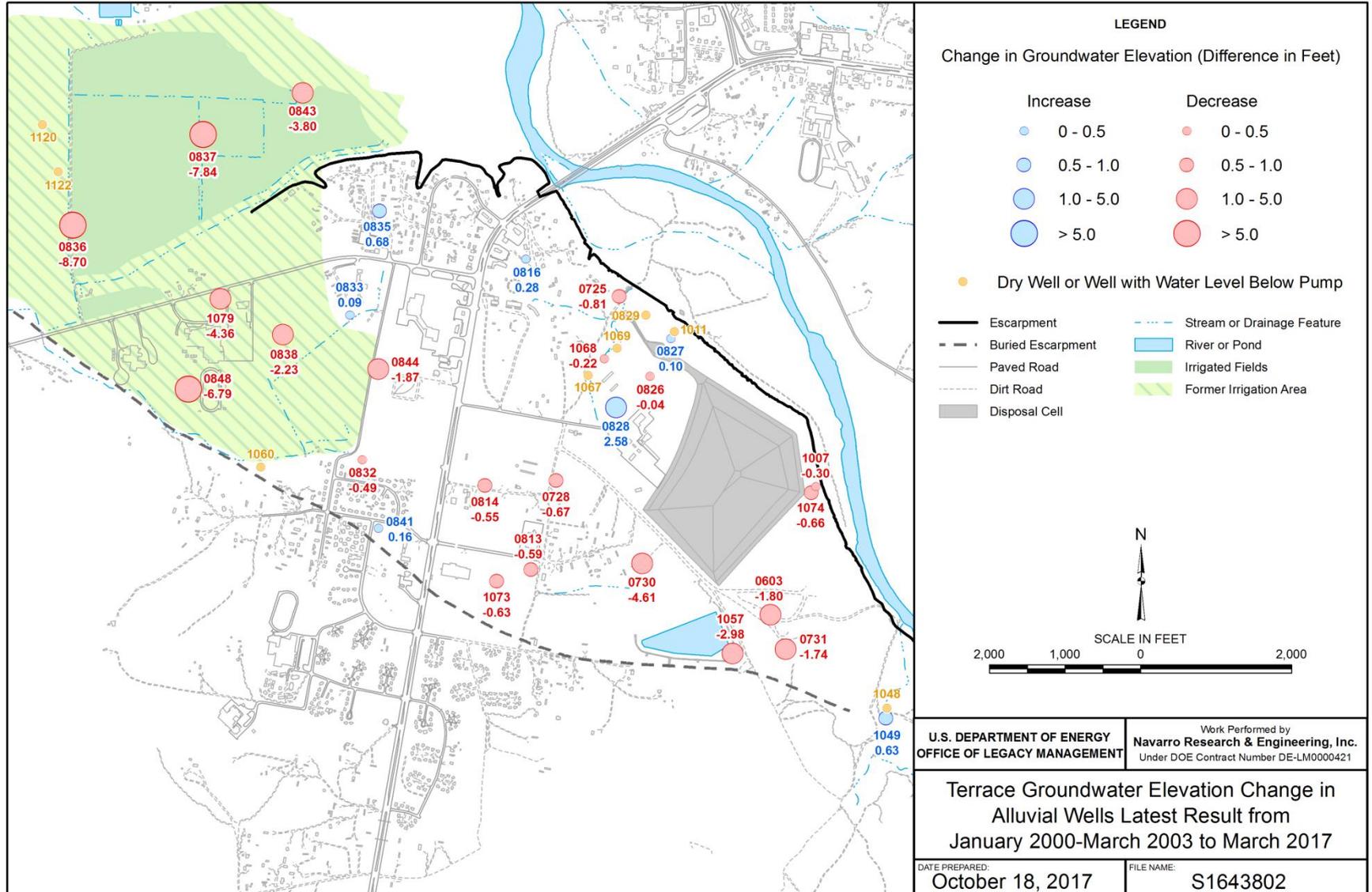
Monitoring well network, Shiprock, NM, Disposal Site

# Status of Remediation

- Since 2003, approximately 150 million gallons have been removed from the floodplain alluvial aquifer and 48 millions gallons from the terrace alluvial aquifer

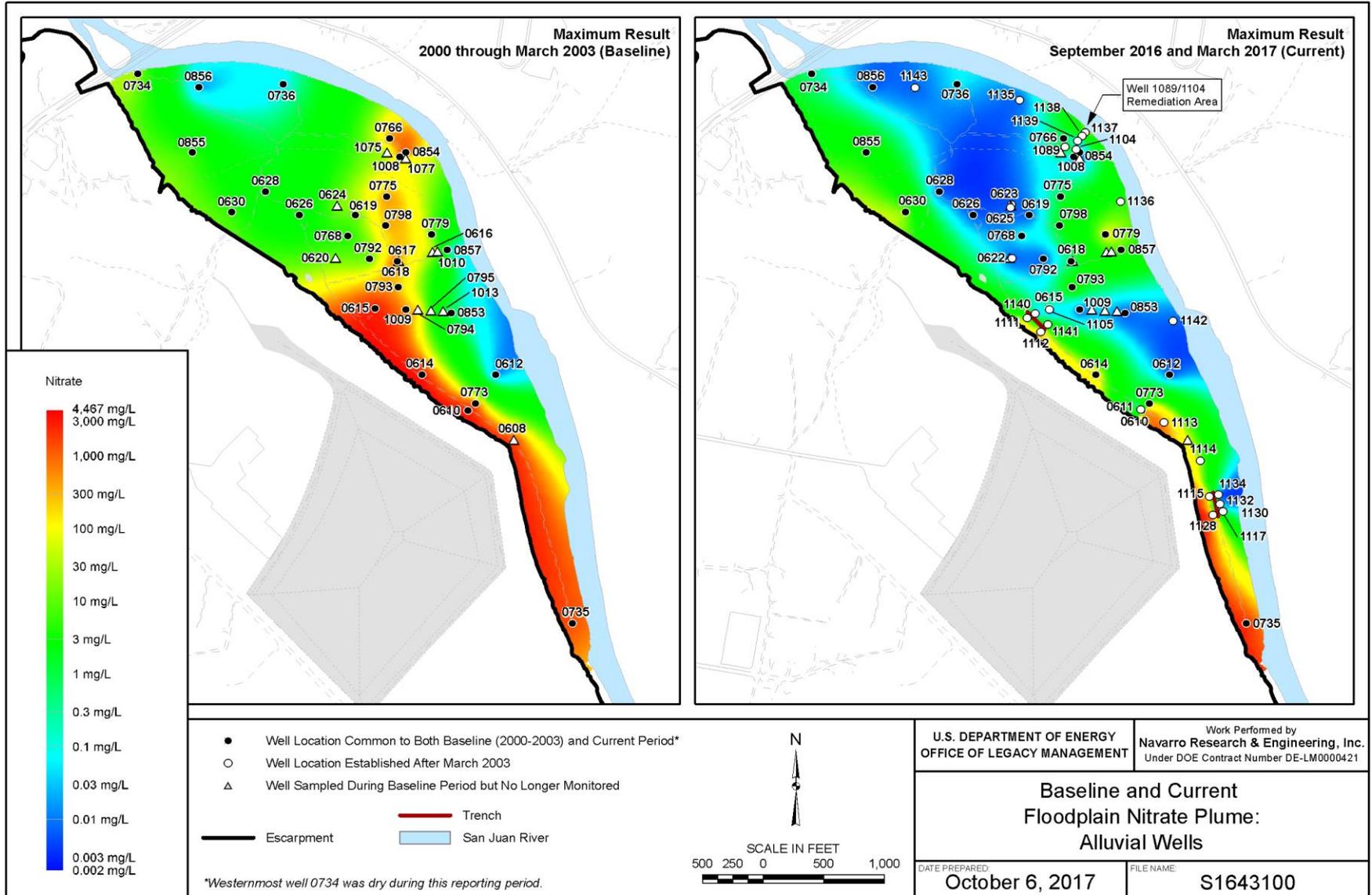


# Groundwater Elevation Change



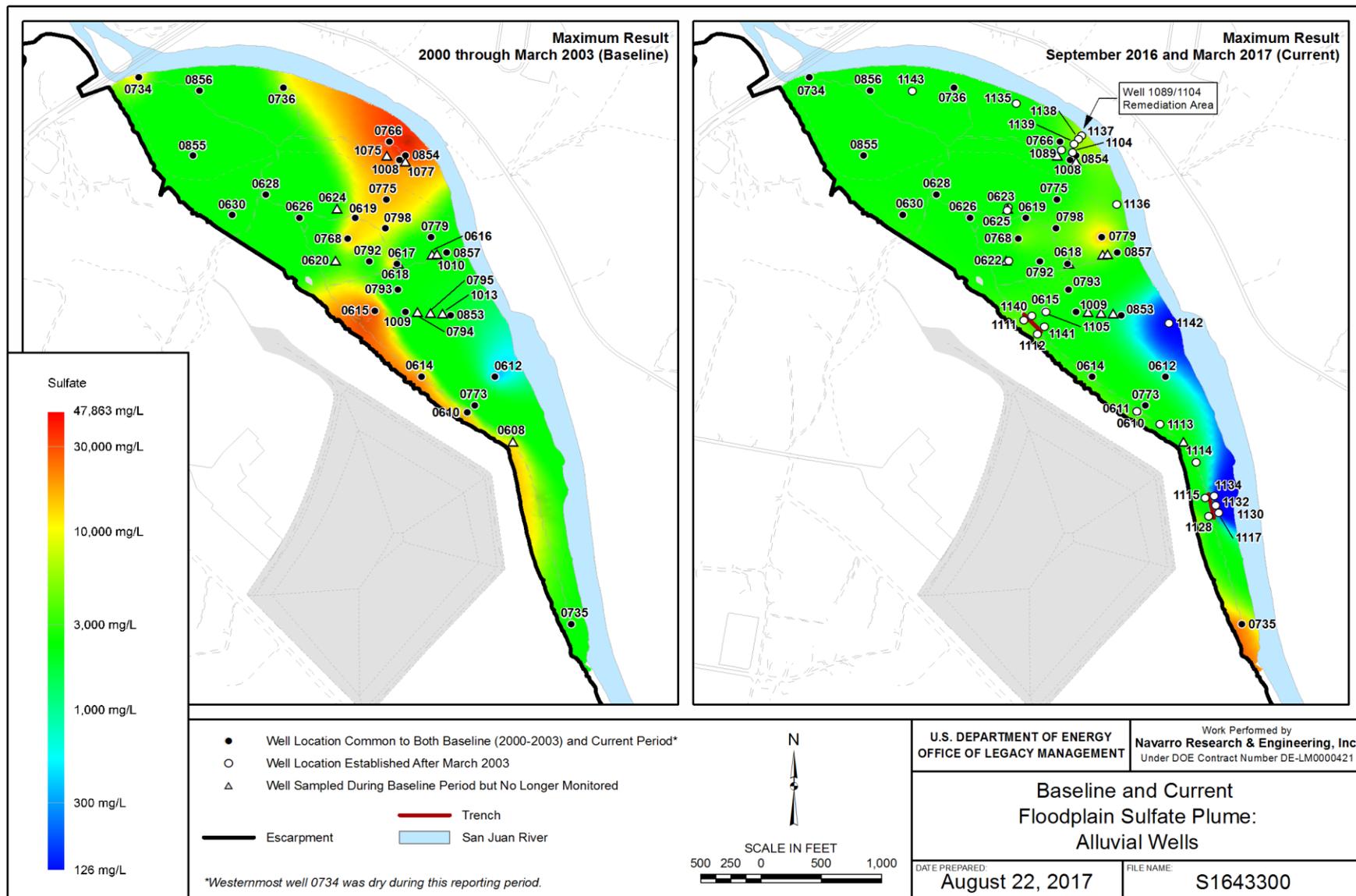
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# Nitrate Plume: Baseline and Current Conditions



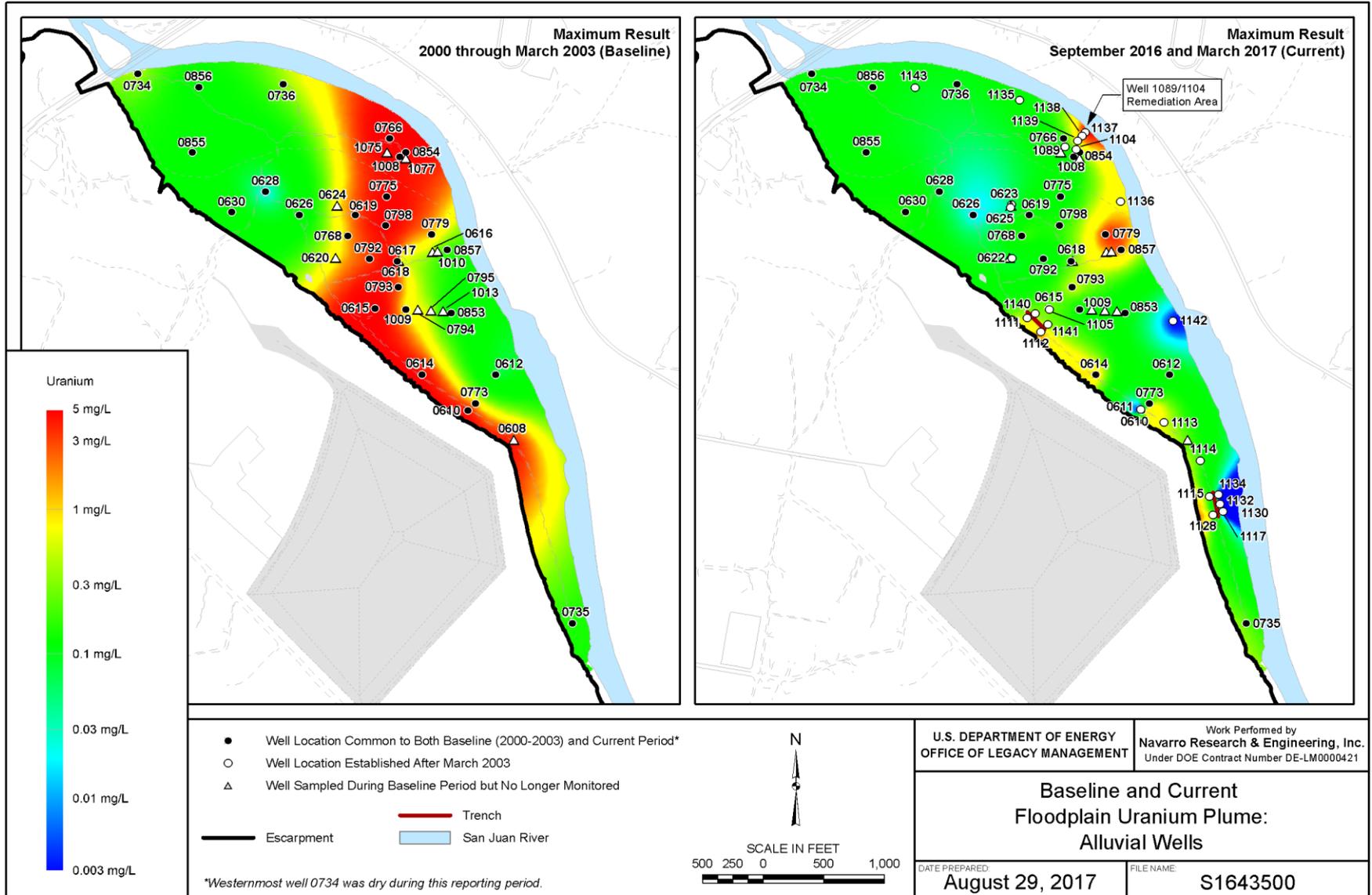
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# Sulfate Plume: Baseline and Current Conditions



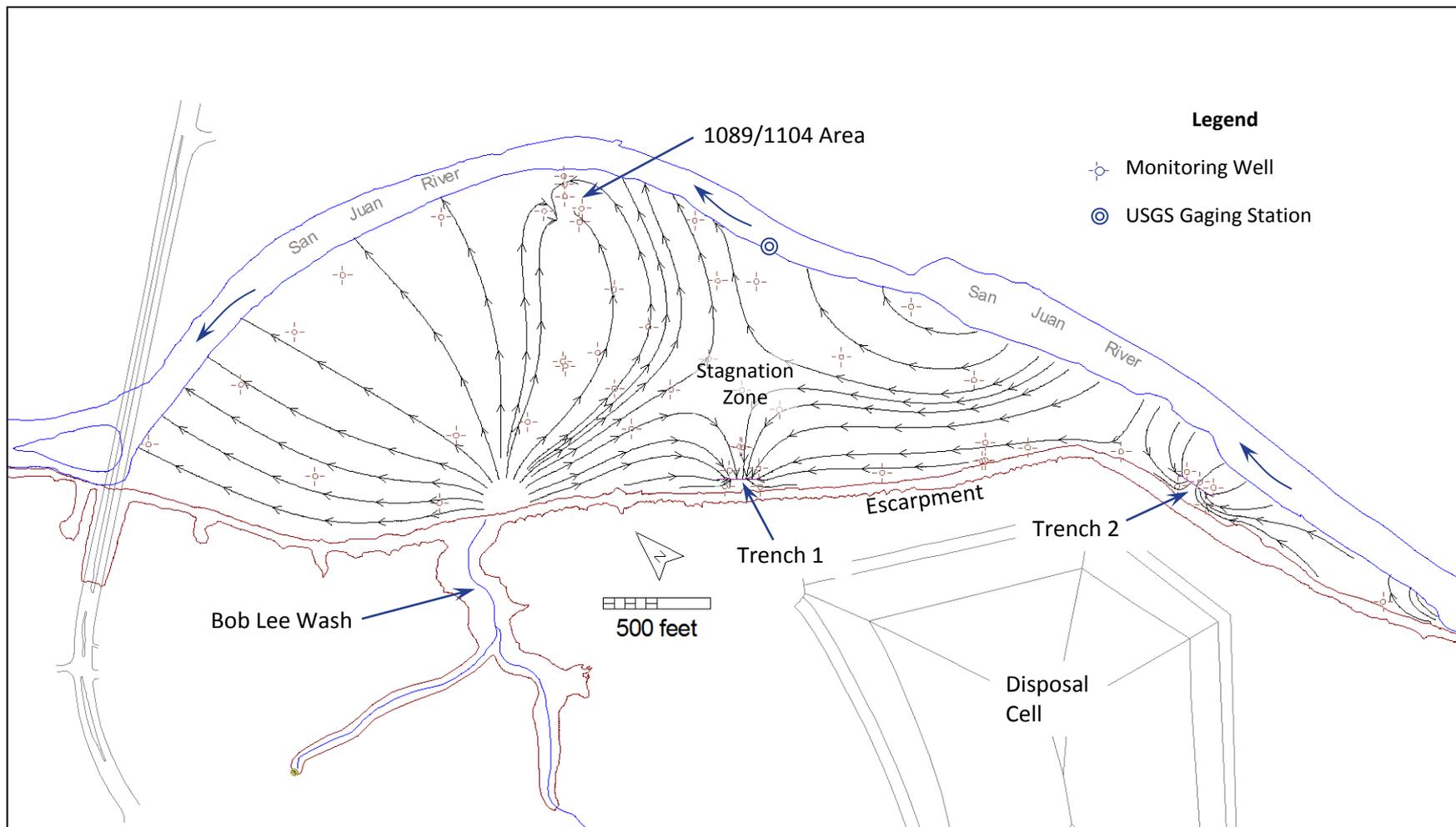
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# Uranium Plume: Baseline and Current Conditions



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# Flow Paths Induced by Remediation Pumping



Model simulation of streamlines in alluvial groundwater system, Shiprock, NM, Disposal Site

# Summary

- Groundwater removal since 2003
  - Approximately 96% of initial volume of groundwater has been removed from the terrace
  - With the exception of Bob Lee Wash all seeps have been dry since 2008
  - Terrace wells produce less than 1 gallon per minute
- Chemical-mass removal since 2003
  - Nitrate – 296,818 pounds
  - Sulfate - 3,889,482 pounds
  - Uranium – 823 pounds



Evaporation pond, 2017

# Information

- LM website: <https://energy.gov/lm>
- Shiprock webpage: <https://www.lm.doe.gov/Shiprock/Sites.aspx>
  - Site fact sheet
  - Long-Term Surveillance and Maintenance Plan
  - Site surveillance and maintenance records
  - Geospatial environmental mapping system
  - Inspection and sampling schedule

The screenshot shows the ENERGY.GOV Office of Legacy Management website. The page is titled "Shiprock, New Mexico, Disposal Site" and is identified as a "UMTRCA Title I site". The breadcrumb trail is "LM Home > LM Sites > New Mexico".

The left sidebar contains the following sections:

- LM Sites**: A dropdown menu labeled "Select a Site" and a map of the United States with "Legacy Management Sites" highlighted in blue.
- Emergency Contact Numbers**: (970) 248-6070 or (877) 695-5322
- Mapping and Monitoring (GEMS)**
- Sites**: A list of site categories including "Considered Sites", "LM Sites", "Pending Transfer Sites", "Programmatic Framework", and "Site Management Guide".

The main content area features a map of New Mexico with a star marking the location of the "Shiprock Disposal Site" near "Santa Fe". Below the map is a photograph of a rocky, desert landscape. To the right of the map, a text block provides information: "The Shiprock Disposal Site, an Uranium Mill Tailings Radiation Control Act (UMTRCA) Title I disposal site, is licensed to DOE for long-term custody and managed by the Office of Legacy Management. The site transferred to the Office of Legacy Management in 2003 and requires routine inspection and maintenance, records-related activities, and stakeholder support. For more information about the Shiprock site, view the [fact sheet](#)."

At the bottom of the page, there are two lists of links:

- Site Documents and Links**:
  - [Contact Us](#)
- Additional Links**:
  - [Shiprock Public Meeting, August 17, 2011](#)
  - [Environmental Sciences Laboratory](#)
  - [Inspection/Sampling Schedule](#)
  - [Shiprock Disposal Site Mapping and Monitoring \(GEMS\)](#)

# Questions and Discussion

